

REMARKS

In the Specification

1. The indicated amendment to the specified paragraph corrects an obvious error in specifying the workpiece material used in the indicated tests. Accordingly, Applicants believe no new matter has been added by this amendment and entry by the Examiner is respectfully requested.

In the Claims

1. Claims 1-28 and 30-38 are pending in the Application.

2. Applicants would like to express their appreciation for the allowance of claims 1-7, 24, and 27. And, as a result of face-to-face discussions between the attorney for Applicants and the Examiner, the allowance of claims 12, 13, 17, 18, 22, and 23.

3. Claim 29 is cancelled herein without prejudice.

4. Claims 35-38 are new.

5. Claim 8 stands rejected under 35. U.S.C. § 102(a) as being anticipated by prior art as shown in Fig. 2 and accompanying text. Claim 8 has been amended. Support for the amendment is found in the Specification at 4:18-23 and 15:15-20. Therefore, Applicants believe no new matter has been added by the indicated amendment and entry by the Examiner is respectfully requested. As further described and attested to in the enclosed Rule 132 Affidavit of Dr. Pingsha Dong, low-conductivity sleeve material helps effect the focused current flow so important to effective nugget formation. In addition, the Affidavit discusses how the presence of a thick sleeve inhibits the formation of a proper nugget. As described and shown in the Rule 132 Affidavit, it has been surprisingly and unexpectedly found that using a sleeve too thick in the

inward direction causes the current to be excessively concentrated and causes an overheating situation. Subsequently reducing the current causes the nugget size to become too small. In addition, a thicker sleeve becomes a larger obstruction for the current to avoid. This new and unexpected result is “different in kind and not merely in degree from . . . the prior art”. *Application of Aller*, 220 F.2d 454, 456 (C.C.P.A. 1955). Finally, as also discussed in the Rule 132 Affidavit, prototype testing of electrodes manufactured according to the present invention compared with “standard” electrodes has shown a reduction in current of about 30 percent with an increase in cycle time of about 25 percent. This resulted in a favorable reduction in energy (I^2t) of about 37 percent. Excellent nuggets were produced.

6. The current-focusing capability of the low-conductivity sleeve of claim 8 to effect an acceptable nugget is an important feature of the instant invention. U.S. Pat. No. 4,514,612 to Nied (“Nied”) describes a composite resistance spot welding electrode comprising a thick outer sleeve of “high strength and high electrical resistivity material” to “take the high contact stress at the edge of the flat end face [of the electrode]”. Nied at Abstract. As stated in Nied, the “[s]hape and dimensions of the electrode tips are affected by mechanical wear and deformation or ‘mushrooming’”. Nied at 1:40-42. While Nied does teach “the high specific resistance of the outer sleeve”, it makes clear that it is the “combination with the transverse thermal and electrical insulation provided by the insulating spacer” that “channels the bulk of the welding current flow into the central region of [the] stem portion”, to “significantly reduce” the “current density singularities at the electrode corner”. Nied at 4:27-33. Nowhere in Nied is there a teaching or suggestion that the sleeve, in proper proportions, can properly focus the current to achieve an acceptable nugget. Finally, as described in the Specification at Fig. 2 and accompanying text, particularly when used with aluminum, weld tips according to Nied exhibit excessive current density in the tip and fail to produce the temperatures necessary to effect a weld. Accordingly, Applicants submit that claim 8, as amended herein, distinguishes patentably from the prior art and withdrawal of this rejection is respectfully requested.

7. Claim 14 stands rejected under 35. U.S.C. § 102(a) as being anticipated by prior art as shown in Fig. 2 and accompanying text. Claim 14 has been amended. Support for the amendment is found in the Specification at 15:1-29, 17:6-8, 18:18-19, and Table 5.

Therefore, Applicants believe no new matter has been added by the indicated amendment and entry by the Examiner is respectfully requested. As further described and attested to in the enclosed Rule 132 Affidavit of Dr. Pingsha Dong, low-conductivity insert material helps effect the focused current flow so important to effective nugget formation. In addition, the Affidavit discusses how a larger insert helps effect an improved nugget.

8. The current-focusing capability of the low-conductivity insert of claim 14 to effect an acceptable nugget is an important feature of the instant invention. Nied describes a composite resistance spot welding electrode comprising “an additional high strength and high electrical resistivity central plug element” to meet the “stress [in the central portion of the tip] preventing the high tendency to deformation in that region.” Nied at 5:14-27. Thus, while Nied does teach a “high electrical resistivity central plug element”, it teaches only the benefit of preventing deformation. Nowhere in Nied is there a teaching of suggestion that the insert, in proper proportions, can properly focus the current to achieve an acceptable nugget. Finally, as described in Fig. 2 and accompanying text, particularly when used with aluminum, weld tips according to Nied exhibit excessive current density in the tip and fail to produce the temperatures necessary to effect a weld. Accordingly, Applicants submit that claim 14, as amended herein, distinguishes patentably from the prior art and withdrawal of this rejection is respectfully requested.

9. Claim 19 stands rejected under 35 U.S.C. § 102(a) as being anticipated by admitted prior art as shown in Fig. 2 and accompanying text. Claim 19 has been amended. Support for the amendment is found in the Specification at 4:18-23 and 15:15-20. Therefore, Applicants believe no new matter has been added by the indicated amendment and entry by the Examiner is respectfully requested. Applicants believe the Rule 132 Affidavit, as described above in Para. 5, and arguments presented above in Para. 6, are equally applicable for the rejection of this claim 19 as they are for claim 8. Accordingly, Applicants submit that claim 19, as amended herein, distinguishes patentably from the prior art and withdrawal of this rejection is respectfully requested.

10. Claim 25 stands rejected under 35 U.S.C. § 102(a) as being anticipated by prior art. Since the Examiner makes no specific reference specifically relating claim 25 to any prior art, respectfully, Applicants are left to speculate as to this rejection. While not admitting to any amendments for reasons of patentability, claim 25 has been amended to more clearly claim the subject matter which Applicants regard as their invention. Support for this amendment is found in the Specification at 15:1-16:10. Applicants note that U.S. Pat. No. 3,689,731 to Miller ("Miller") teaches the use of a circumferential slot "closely spaced from the face" to "concentrate current flow". Miller at 2:43-44 and Abstract. Miller then provides a washer-like insert to support the void created by the slot. Nowhere in Miller is there a teaching or suggestion that an annular ring, properly placed can focus the current to achieve, particularly with aluminum, an acceptable nugget.

11. Claim 26 stands rejected under 35 U.S.C. § 102(a) as being anticipated by prior art. Since the Examiner makes no specific reference specifically relating claim 26 to any admitted prior art, respectfully, Applicants are left to speculate as to this rejection. Clarification by the Examiner is respectfully requested.

12. Claim 28 stands rejected under 35 U.S.C. § 102(a) as being anticipated by prior art. Applicants respectfully traverse this rejection. Nowhere in the cited prior art is there described the embodiment claimed in claim 28. Specifically, the electrode shown in Fig. 2 and accompanying text does not include a sleeve end surface cooperating with the inner portion end surface to form a continuous face. As shown in Fig. 2, the confluence of the sleeve and the inner portion end surface is a discontinuity; the sleeve in no way cooperates to form a continuous face. Notwithstanding the above, claim 28 has been amended to more clearly claim the subject matter which Applicants regard as their invention. Support for this amendment is found in throughout the Specification and at Fig. 6a and accompanying text. Therefore, Applicants believe no new matter has been added by the indicated amendment and entry by the Examiner is respectfully requested.

13. Claims 35-38 are new. Support in the Specification is found as follows:

Claim 35	Throughout the Specification, but particularly in Fig. 4 and accompanying text.
Claim 36	Specification at 15:15-20.
Claim 37	Throughout the Specification, but particularly in Figs 4, 5, 6, and 7 and accompanying text.
Claim 38	Specification at 15:25-29.

Therefore, Applicants believe no new matter has been added by the new claims and entry by the Examiner is respectfully requested.

14. The attorney for Applicants and the Examiner met in the office of the Examiner at the USPTO on Wednesday, May 25, 2005 to discuss the status of the case. During that interview, it was agreed that ranges present in independent claims 8, 14, and 25 would be amended to further restrict claimed ranges. As presented herein, these amendments have been made. In addition, the Examiner withdrew his rejection of claims 12, 13, 17, 18, 22, and 23.

Closure

1. Previously, fees were paid for a total of 34 claims and 7 independent claims. As submitted herewith, a total of 37 claims and 7 independent claims are remaining with the Application. Pursuant to 37 C.F.R. §§ 1.16(i), additional fees in the amount of \$75.00 are due.

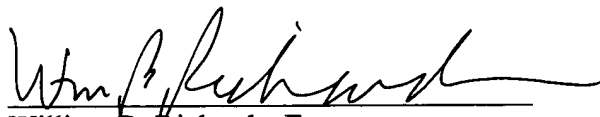
2. This is a request for a one-month extension of time to respond to the Office Action. The Shortened Statutory Period for response was set to expire May 23, 2005. Pursuant to 37 C.F.R. § 1.17(a)(1), a fee in the amount of \$60.00 is due.

3. Applicants enclose herewith a credit card authorization form PTO-2038 for \$135.00 for the abovementioned fees. Please charge any additional fees, or credit any overpayments in connection with this Response to Applicants' undersigned counsel's Deposit Account 021266. A duplicate copy of this authorization is also enclosed.

4. Applicants' undersigned attorney has made a good faith effort to meet the concerns expressed by the Examiner in the Office Action. If the Examiner still has some issues with the Application, and has any suggestions as to how to address the, the Examiner is invited to call the Applicants' undersigned attorney at the phone number given below, so that those issues may be resolved.

5. Accordingly, Applicants submit that this Application is now in condition for further favorable consideration, culminating in allowance. Such action is respectfully requested.

Respectfully submitted,



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